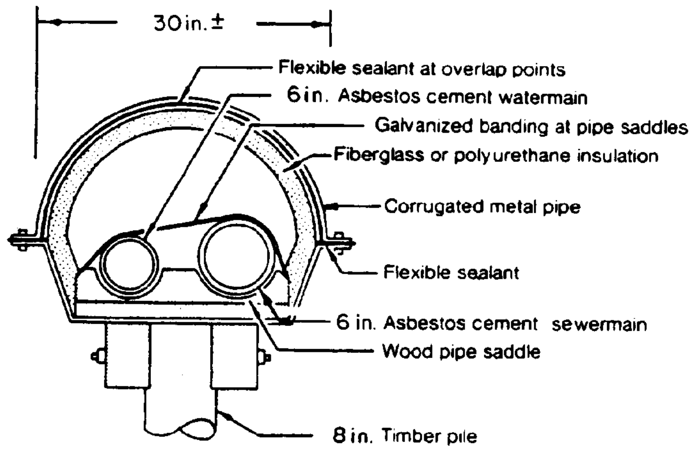
CHAPTER 8
UTILIDORS

8-1. General.

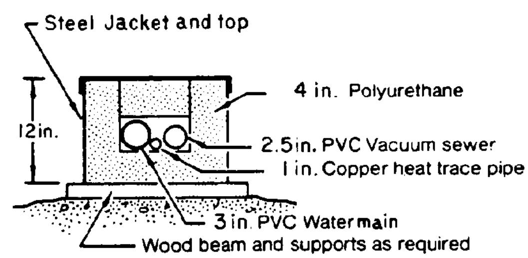
A utilidor is a conduit that contains multiple utility systems such as water, sewerage, fuel oil, gas, electrical power, telephone, and central heating in various combinations or in some cases all together. They have been used at a number of military installations and civilian communities in the North American Arctic. Utilidors are very expensive and can only be justified for special situations. In most cases individually insulated pipes in a common trench or on a common pile will be more economical. Utilidors have been constructed above and below ground, and range in size from a simple insulated conduit to a walk-through passageway. Figures 8-1 and 8-2 illustrate typical utilidor configurations that have been constructed recently in the cold regions. These new designs typically incorporate lighter construction materials than the reinforced concrete used previously at many military installations.

8-2. Design considerations.

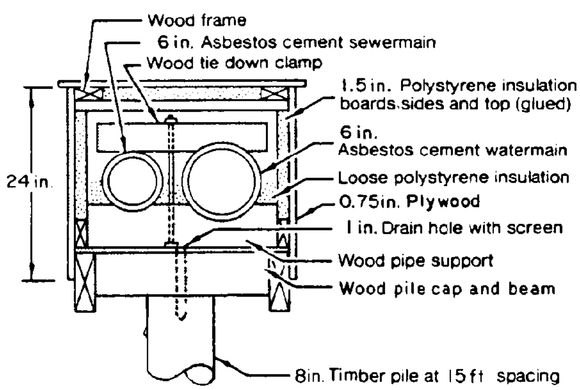
The thermal design of the utilidor is made in accordance with the procedures in chapter 12. The foundation design must be in accordance with TM 5-852-4/AFM 88-19, Chap. 4. Both designs are influenced by the types of utilities that are included. The inclusion of power, telephone, and gas lines along with water and sewerage in a utilidor will not cause design or operational problems. However, the inclusion of central heating lines is more complex. Their heat losses are usually great enough to protect the water and sewage pipes from freezing but the utilidor usually has to be much bigger to provide continuous easy access to steam and condensate lines, and therefore construction costs will increase. Problems also occur because this heat source is constant and must operate all or most of the year. In the summer, undesirably high domestic water supply temperatures can result due to exposure to the excess heat ($<80^\circ$F). The heating of a large air space in the utilidor is less efficient than direct heating and circulation of the water supply in the winter. Thermal stratification can cause freezing of the lower pipes in large utilidors even when the average air temperature is adequate. Figure 8-3 illustrates the temperature variation within a small utilidor. The cold water line was placed on one side to maintain desirable temperatures for the consumers and the hot water lines on the other side. Under extreme conditions this cold water line froze and burst due to the thermal shielding, in spite of the continuous circulation of hot water. When transport methods permit prefabrication of the major utilidor components is recommended to reduce construction costs in the field. The heat sources for freeze protection should be located near the bottom of large utilidors if possible to ensure distribution of heat. Sensitive piping (e.g. water) should not then be shielded from these heat sources. If the heat sources (i.e. steam and condensate lines) are operational all year, separate insulation of domestic water lines is recommended to maintain acceptable cold water temperatures for domestic use. The utilidors shown in Figure 8-1 all have prefabricated components. All of these units can be entirely prefabricated in a convenient unit length. A hydrant unit on an above-ground utilidor of the type in figure 8-2b is shown in figure 8-4. When both water and sewage lines are exposed in the same utilidor, the sewer access cleanouts must be sealed to prevent cross connections. Flanged elbows or pipes larger than 8 inches in diameter are large enough to insert cleaning or thawing equipment. Standard fittings or smaller pipes do not provide adequate access in both directions. Figures 8-5 illustrates details of sewer cleanouts that have been used for this purpose.



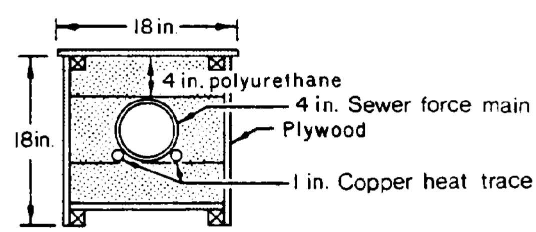
Utilidor, Inuvik, N.W.T.



Utilidor with vacuum sewer, Noorvik, Alaska



Plywood box utilidor, Inuvik, N.W.T.



Single pipe with heat tracing, Noorvik, Alaska

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Figure 8-1. Various utilidors installed in cold regions.

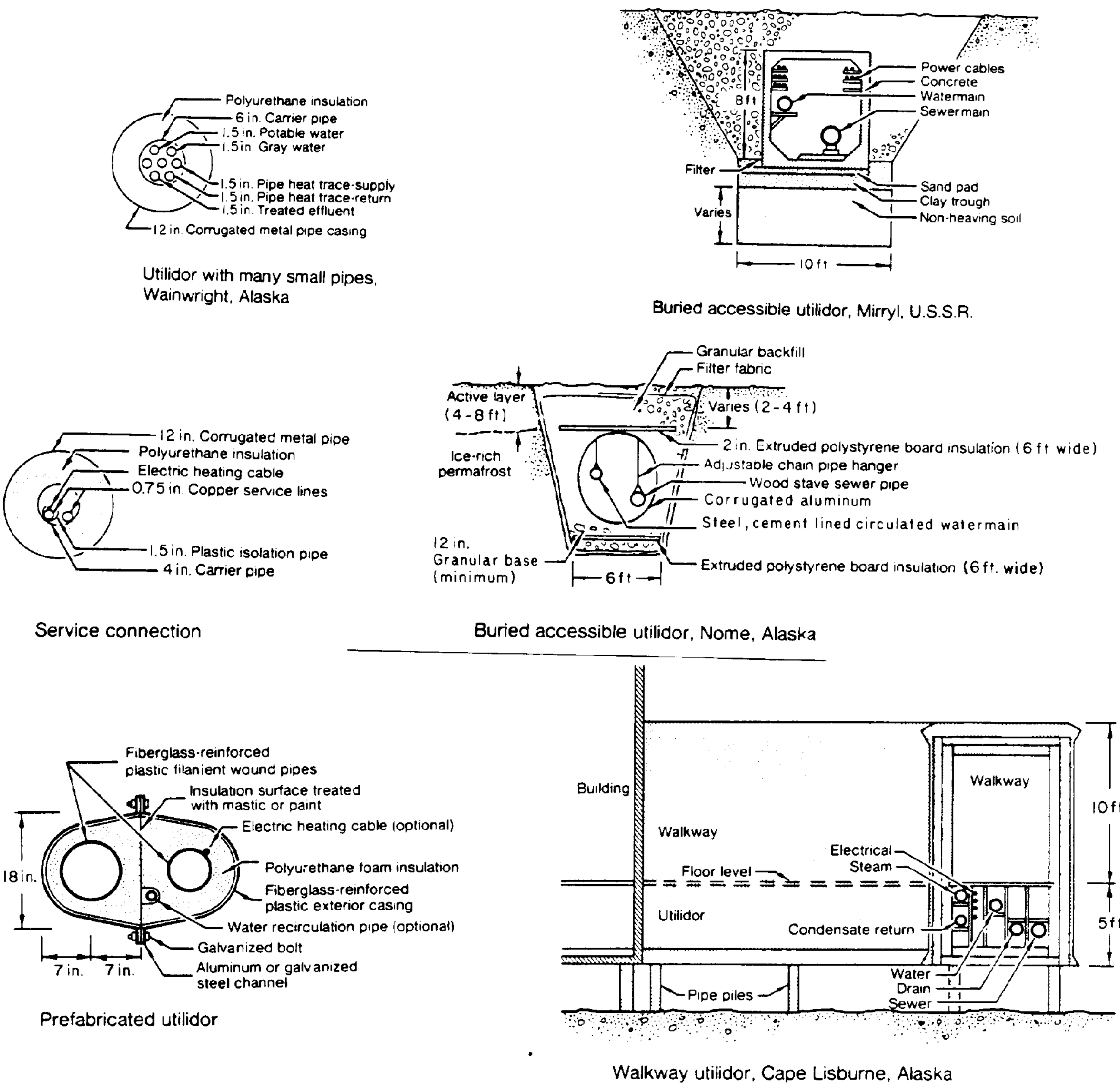

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Figure 8-2. Typical utilidors.

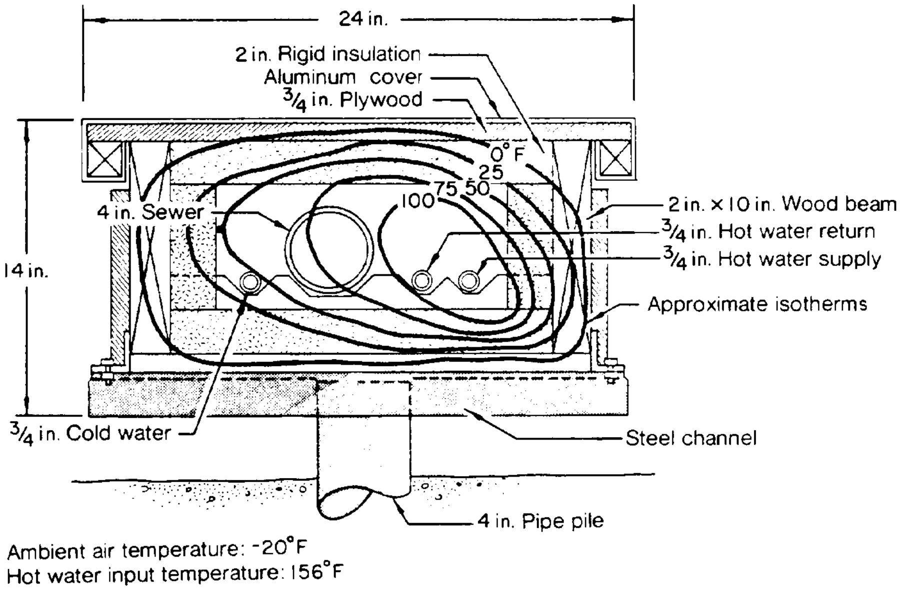

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Figure 8-3. Temperature variation in a small utilidor with central hot water distribution.

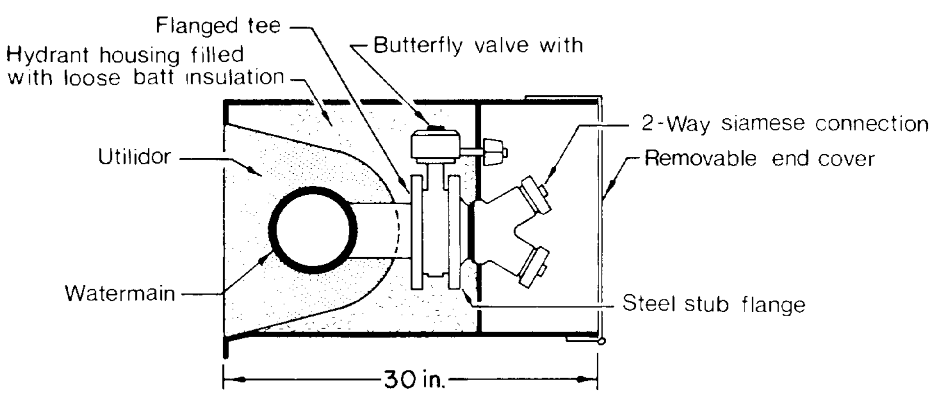

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Figure 8-4. Above-ground utilidor hydrant.

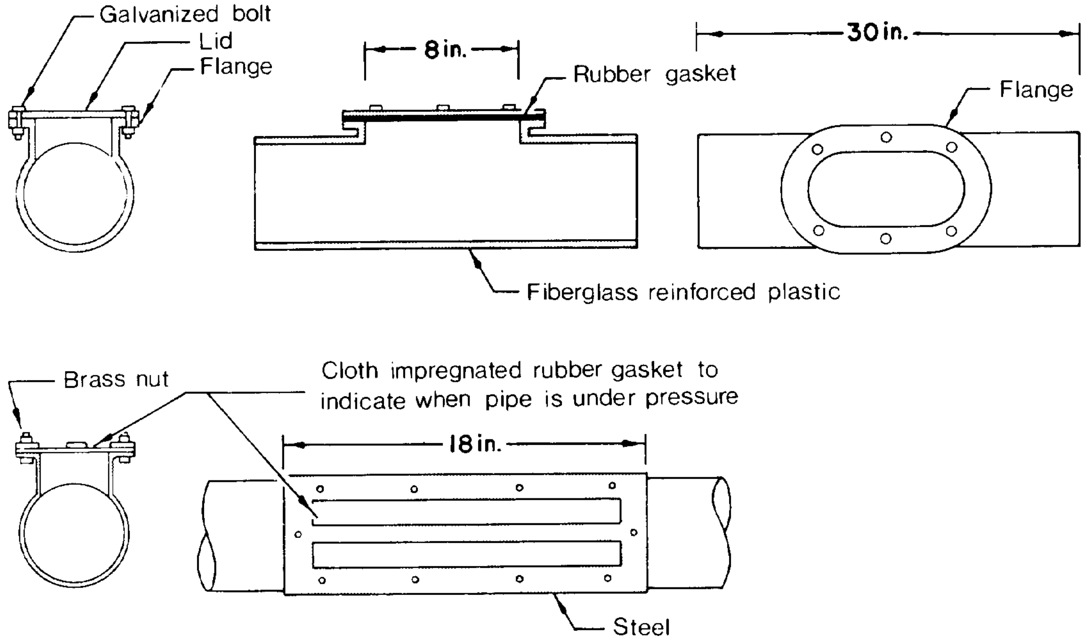

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Figure 8-5. Sewer cleanouts.